



Electromechanical Engineering Program



B.Sc. Program Matrices

Bylaw 2023 according to NARS2018

Benha University – Benha Faculty of Engineering

2024-2025

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1. Faculty Mission vs. Program Mission Matrix

To judge the compatibility of faculty mission with the program mission, the following matrix is used:

Faculty Mission		Program Mission		
		Electromechanical Engineering Program is committed to graduate engineers with an outstanding knowledge and specialized skills, keeping up with the rapid developing trends, and providing research to serve society and the community.		
		Program is committed to graduate engineers with an outstanding knowledge and specialized skills	Keeping up with the rapid developing trends	Providing research to serve society and community.
Benha Faculty of Engineering - Benha University is committed to graduate well prepared engineers equipped with knowledge and skills necessary to compete in labor market, and capable of using and developing modern technology, and providing research in engineering fields to serve society and community.	Benha Faculty of Engineering - Benha University is committed to graduate well prepared engineers equipped with knowledge and skills necessary to compete in labor market	*		
	Capable of using and developing modern technology		*	
	Providing research in engineering fields to serve society and community			*

2. Program Mission vs. Program Objectives Matrix

To judge the compatibility of program objectives with its mission, the following matrix is used:

Program Mission		Program Objectives					
		PO1	PO2	PO3	PO4	PO5	PO6
Electromechanical Engineering Program is committed to graduate engineers with an outstanding knowledge and specialized skills, keeping up with the rapid developing trends, and providing research to serve society and the community.	Program is committed to graduate engineers with an outstanding knowledge and specialized skills	*				*	*
	Keeping up with the rapid developing trends		*	*	*	*	*
	Providing research to serve society and community.				*		*

3. Program Competencies Vs. (NARS 2018) CBE Matrix

To judge the compatibility of program competencies and the CBE (NARS 2018), the following matrix is used:

Program Competencies	(NARS 2018) CBE Matrix																	
	A – Level										Mechanical				Electrical			
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B1	B2	B3	B4
A 1	*																	
A 2		*																
A 3			*															
A 4				*														
A 5					*													
A 6						*												
A 7							*											
A 8								*										
A 9									*									
A 10										*								
B 1											*							
B 2												*						
B 3													*					
B 4														*				
D 1															*			
D 2																*		
D 3																	*	
D 4																		*

4. Program Learning Outcomes Vs. (NARS 2018) CBE Matrix

Program Learning Outcomes	(NARS 2018) CBE Matrix																	
	A – Level										Mechanical				Electrical			
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	B1	B2	B3	B4
PLO 1	*																	
PLO 2		*																
PLO 3			*															
PLO 4				*														
PLO 5					*													
PLO 6						*												
PLO 7							*											
PLO 8								*										
PLO 9									*									
PLO 10										*								
PLO 11											*							
PLO 12												*						
PLO 13													*					
PLO 14														*				
PLO 15															*			
PLO 16																*		
PLO 17																	*	
PLO 18																	*	

5. ARS of Program Vs. B-Level Electrical (NARS 2018) Matrix

		B-Level Electrical (NARS 2018) (CBE)				
		B1	B2	B3	B4	B5
ARS of Program	D1	*				
	D2		*			
	D3			*		
	D4				*	

6. Program Learning Outcomes Vs. Program Competencies

To judge the compatibility of program competencies and its learning outcomes, the following matrix is used:

Program Learning Outcomes	Program Competencies																	
	A – Level										B-Level				D-Level			
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	D1	D2	D3	D4
PLO 1	*																	
PLO 2		*																
PLO 3			*															
PLO 4				*														
PLO 5					*													
PLO 6						*												
PLO 7							*											
PLO 8								*										
PLO 9									*									
PLO 10										*								
PLO 11											*							
PLO 12												*						
PLO 13													*					
PLO 14														*				
PLO 15															*			
PLO 16																*		
PLO 17																	*	
PLO 18																		*

7. Program Mission Vs. Program Competencies Matrix

To judge the compatibility of program mission with its competencies, the following matrix is used:

Program Mission		Program Competencies																	
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	D1	D2	D3	D4
Electromechanical Engineering Program is committed to graduate engineers with an outstanding knowledge and specialized skills, keeping up with the rapid developing trends, and providing research to serve society and the community.	Program is committed to graduate engineers with an outstanding knowledge and specialized skills	*	*	*	*		*	*	*	*		*	*	*	*	*	*	*	*
	Keeping up with the rapid developing trends	*	*	*	*	*				*	*	*	*	*	*	*	*	*	*
	Providing research to serve society and community.	*	*			*	*		*		*	*	*	*		*			*

8. Program Objectives Vs. Program Competencies Matrix

To judge the compatibility of program objectives with its competencies, the following matrix is used:

Program Objectives	Program Competencies																	
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	D1	D2	D3	D4
PO1	*	*	*						*		*	*	*	*	*	*	*	*
PO2	*		*				*				*	*	*	*				
PO3							*	*	*		*	*	*	*				
PO4					*			*		*	*	*	*	*	*			
PO5			*	*			*	*	*		*	*	*	*	*	*	*	*
PO6	*	*				*					*	*	*	*	*	*	*	*

9. Program Objectives Vs. Graduate Attributes Matrix

To judge the compatibility of program objectives with its graduate attributes, the following matrix is used:

Program Objectives	Graduate Attributes													
	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12	GA13	GA14
PO1	*	*									*			
PO2			*		*	*							*	
PO3				*						*				
PO4								*	*					
PO5							*				*	*		*
PO6							*					*		*

10. Program Competencies Vs. Graduate Attributes Matrix

To judge the compatibility of program graduate attributes with its competencies, the following matrix is used:

Program Competencies	Graduate Attributes													
	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12	GA13	GA14
A1	*	*									*			*
A2		*												*
A3			*		*	*						*		
A4						*	*						*	
A5								*					*	
A6				*										
A7				*										
A8									*			*		
A9										*				
A10								*				*		
B1												*	*	*
B2											*	*		*

Program Competencies	Graduate Attributes													
	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12	GA13	GA14
B3													*	
B4													*	
D1														*
D2											*	*		*
D3											*	*		
D4													*	

11. Graduate Attributes Vs. Requirements Matrix

Graduate Attributes	Key Words of Requirements			
	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirements
GA1. Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.		√	√	
GA2. Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.			√	√
GA3. Behave professionally and adhere to engineering ethics and standards.		√		
GA4. Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.		√		

Graduate Attributes	Key Words of Requirements			
	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirements
GA5. Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.				√
GA6. Value the importance of the environment, both physical and natural, and work to promote sustainability principles.	√			
GA7. Use techniques, skills, and modern engineering tools necessary for engineering practice.		√	√	
GA8. Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.	√			
GA9. Communicate effectively using different modes, tools, and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.	√			
GA10. Demonstrate leadership qualities, business administration and entrepreneurial skills.	√			
GA11. Communicate effectively with experience to the use of computer applications in various electromechanical engineering disciplines.				√
GA12. Produce a design system that satisfies a given specification in electromechanical system.				√
GA13. Evaluate the sustainability and environmental issues related to electromechanical systems.				√
GA14. Solve problems in the areas of integrated mechanics, electronics, computers, and software systems, and analyze and investigate the inter-disciplinary characteristics of mechanical, electrical, and hydraulic systems.				√

12. Program Objectives Vs. Requirements Matrix

Program Objectives	Key Words of Requirements			
	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirements
PO1. Apply a wide spectrum of engineering knowledge, science and specialized skills with analytic, critical and systemic thinking to identify and solve engineering problems in real life situation.		√		
PO2. Behave professionally and adhere to engineering ethics and standards and work to develop the profession and the community and promote sustainability principles.		√	√	
PO3. Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills.				√
PO4. Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields	√			
PO5. Solve problems in the areas of integrated mechanics, electronics, computers, and software systems.			√	√
PO6. Capable of analyzing and investigating the inter-disciplinary characteristics of mechanical, electrical, and hydraulic systems.				√

13. Program Objectives Vs. Subject Area Matrix

Program Objectives	Key Words of Subject Area						
	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary (Institution character-identifying) subject
PO1. Apply a wide spectrum of engineering knowledge, science and specialized skills with analytic, critical and systemic thinking to identify and solve engineering problems in real life situation.	√	√		√		√	
PO2. Behave professionally and adhere to engineering ethics and standards and work to develop the profession and the community and promote sustainability principles.	√			√			√
PO3. Work in and lead a heterogeneous team and display leadership qualities, business administration, and entrepreneurial skills.			√		√		√

Program Objectives	Key Words of Subject Area						
	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary (Institution character-identifying) subject
PO4. Master self-learning and life-long learning strategies to communicate effectively in academic/professional fields	√	√	√			√	
PO5. Solve problems in the areas of integrated mechanics, electronics, computers, and software systems.				√		√	√
PO6. Capable of analyzing and investigating the inter-disciplinary characteristics of mechanical, electrical, and hydraulic systems.				√		√	√

14. Graduates Attributes Vs. Subject Area Matrix

Graduate Attributes	Key Words of Subject Area						
	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary (Institution character-identifying) subject
GA1. Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations.	√	√		√			
GA2. Apply analytic critical and systemic thinking to identify, diagnose and solve engineering problems with a wide range of complexity and variation.				√		√	√
GA3. Behave professionally and adhere to engineering ethics and standards.	√		√				√
GA4. Work in and lead a heterogeneous team of professionals from different engineering specialties and assume responsibility for own and team performance.			√		√		√
GA5. Recognize his/her role in promoting the engineering field and contribute in the development of the profession and the community.		√	√			√	
GA6. Value the importance of the environment, both physical and natural, and work to promote sustainability principles.	√	√	√				

Graduate Attributes	Key Words of Subject Area						
	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary (Institution character-identifying) subject
GA7. Use techniques, skills, and modern engineering tools necessary for engineering practice.					√		√
GA8. Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies.	√	√	√				
GA9. Communicate effectively using different modes, tools, and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner.	√		√		√		
GA10. Demonstrate leadership qualities, business administration and entrepreneurial skills.				√	√		
GA11. Communicate effectively with experience to the use of computer applications in various electromechanical engineering disciplines.					√		√
GA12. Produce a design system that satisfies a given specification in electromechanical system.				√		√	√
GA13. Evaluate the sustainability and environmental issues related to			√	√			√

Graduate Attributes	Key Words of Subject Area						
	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary (Institution character-identifying) subject
electromechanical systems.							
GA14. Solve problems in the areas of integrated mechanics, electronics, computers, and software systems, and analyze and investigate the interdisciplinary characteristics of mechanical, electrical, and hydraulic systems.				√	√		√

15. Subject Area

15.1 Table of % of Subject Area

Subject Area	Required	Program Total Credit Hours	
		Hours of five Levels	% Hours of five Levels
Humanities and Social Sciences	9-12%	14	8.75
Mathematics and Basic Sciences	20-26%	36	22.5
Basic Engineering Sciences	20-23%	33	20.625
Applied Engineering and Design	20-22%	34	21.25
Computer Applications and ICT	9-11%	17	10.625
Projects and Practice	8-10%	14	8.75
Discretionary	6-8%	12	7.5

15.2 Program Courses Vs. Subject Area Matrix

Level	Courses		Pr. Req.	Weekly Contact Hours					Credit Hours of Subject Area						
	Code	Course Title		Cr. Hrs	Lect.	Lab.	Tut.	Total	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
Level 0	FRB001	Analytical geometry & Linear Algebra	.....	3	2	0	2	4		3					
	FRB003	Statics	.....	3	2	0	2	4		3					
	FRB005	Waves and Heat	.....	3	2	2	1	5		3					
	FRB007	Chemistry for Engineers	.....	4	3	2	1	6		4					
	FRM009	Engineering Drawing	.....	2	0	0	4	4			2				
	UHS101	Foreign Language	.....	2	2	0	0	2	2						
	UHS103	Social issues	.....	2	2	0	0	2	2						
	FRB002	Integration & Multivariable functions	FRB001	3	2	0	2	4		3					
	FRB004	Dynamics	FRB003	3	2	0	2	4		3					
	FRB006	Electricity and Magnetism	.....	3	2	2	1	5		3					
	FRM008	Production Systems Engineering	.....	2	1	3	0	4			2				
	FRM010	Computer Aided Drafting	FRM009	2	1	2	0	3					2		
	FRE012	Computer Programming Fundamentals	.....	2	0	2	2	4			2				
UHS102	Information and Communication	.....	2	2	0	0	2	2							

Level	Courses		Pr. Req.	Weekly Contact Hours					Credit Hours of Subject Area						
	Code	Course Title		Cr. Hrs	Lect.	Lab.	Tut.	Total	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
		Technology													
Level 1	FRB 101	Engineering Differential Equations	FRB 002	3	2	0	2	4		3					
	EMM 101	Fluid Mechanics I	FRB 004	2	2	1	0	3			2				
	EMM 103	Mechanics of Machinery	FRB 004	3	2	0	2	4			3				
	EME 105	Electric Circuits Analysis	FRB 006	3	2	1	2	5			3				
	EMM 107	Strength and properties of Materials	FRB 004	2	2	1	0	3			2				
	EMM 109	Thermodynamics I	FRB 005	2	2	1	0	3			2				
	FRB 103	Environmental Pollution and Industrial Safety	FRB 007	2	2	1	0	3		2					
	FRB 104	Engineering Numerical Analysis	FRB 101	3	2	0	2	4		3					
	EMM 102	Fluid Mechanics II	EMM 101	2	2	1	0	3			2				
	EMM 104	Manufacture Technology	FRM 008	3	2	2	0	4				3			
	EME 106	Electrical Machines	EME 105	3	2	1	1	4				3			
	EMM 108	Measurements and Instrumentation	FRB 006	3	2	1	1	4				3			
EMM 110	Solid Mechanics	EMM 107	2	2	1	0	3				2				
EMM 112	Thermodynamics II	EMM 109	2	2	1	0	3			2					

Level	Courses		Pr. Req.	Weekly Contact Hours					Credit Hours of Subject Area						
	Code	Course Title		Cr. Hrs	Lect.	Lab.	Tut.	Total	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
Level 2	FRB 201	Applied Engineering Probability and Mathematical Statistics	FRB 002	3	2	2	0	4		3					
	EME 201	Logic Circuits and Micro processors	EME 105	3	2	1	2	5			3				
	EMM 203	Heat Transfer	EMM 109	3	2	1	1	4			3				
	EMM 205	Projects Management	.....	2	2	0	1	3			2				
	EME 207	Electrical Power Systems	EME 106	3	2	0	2	4				3			
	EMM 209	Design of Machine Elements	EMM 104 & EMM 110	3	2	1	2	5				3			
	FRB 206	Multiple Integrals & Complex Analysis	FRB 002	3	2	0	2	4		3					
	EMM 202	Vibrations and System Dynamics	EMM 103, EMM 107	3	2	1	1	4			3				
	EMM 204	Plumbing Systems	EMM 102	3	2	0	2	4						3	
	EME 206	Electronic Devices and Circuits	EME 201	3	2	1	1	4				3			
	EMM 208	Fluid Machinery	EMM 102	3	2	1	1	4				3			
EME 210	Electric Power Distribution Systems	EME 207	3	2	0	3	5						3		
Level 3	EMM 301	Refrigeration	EMM 112	2	2	1	0	3				2			
	EMM 303	Air Conditioning Systems	EMM 112	3	2	1	1	4				3			
	EME 305	Low Current Distribution Systems	EME 210	3	2	0	2	4					3		

Level	Courses		Pr. Req.	Weekly Contact Hours					Credit Hours of Subject Area						
	Code	Course Title		Cr. Hrs	Lect.	Lab.	Tut.	Total	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
	EMM 307	Fire Fighting Systems	EMM 102	3	2	0	2	4						3	
	EMM 309	Combustion	EMM 112	3	2	1	1	4				3			
	UHS XXX	Humanities Elective I	.....	2	2	0	0	2	2						
	UHS XXX	Humanities Elective II	.....	2	2	0	0	2	2						
	EMM 302	Refrigeration and AC Systems/Components	EMM 301 & EMM 303	3	2	1	1	4				3			
	EME 304	Automatic Control	EME 106	2	2	1	0	3					2		
	EMM 3XX	Elective I	*	3	2	0	2	4							3
	EME 3XX	Elective II	*	3	2	0	2	4							3
	EMM 3XX	Elective III	*	3	2	0	2	4							3
	EMM 390	Senior Design Project I	**	2	0	4	0	4						2	
	UHS 104	Professional Ethics	.....	2	2	0	0	2	2						
Level 4	EMM 401	Computer Applications in EI/Mec System	EME 305 & EMM 303	2	1	2	0	3					2		
	EMM 403	Process Control and Building management System	EME 304	2	2	1	0	3					2		
	EMM 3XX	Elective IV	*	3	2	0	2	4							3
	EME 3XX	Elective V	*	3	2	0	2	4					3		
	EMM 3XX	Elective VI	*	3	2	0	2	4					3		

Level	Courses		Pr. Req.	Weekly Contact Hours					Credit Hours of Subject Area						
	Code	Course Title		Cr. Hrs	Lect.	Lab.	Tut.	Total	Humanities and Social Sciences	Mathematics and Basic Sciences	Basic Engineering Sciences	Applied Engineering and Design	Computer Applications and ICT	Projects and Practice	Discretionary
	UHS XXX	Humanities Elective III	.....	2	2	0	0	2	2						
	EMM 490	Senior Design Project II	EMM 390	3	1	4	0	5						3	
FT	FT 103	Field Training I	***												
	FT 203	Field Training II	****												
Total hours of five Levels									14	36	33	34	17	14	12
% Hours of five Levels									8.75	22.5	20.625	21.25	10.625	8.75	7.5
Reference Ratio from NARS									9-12%	20-26%	20-23%	20-22%	9-11%	8-10%	6-8%
** The student can register for the Senior Design Project course after passing 70% of the program cr. hr_s, 112 hr_s															
*** Completion of 65 Credit Hours															
****Completion of 96 Credit Hours															

16. Program Competencies Vs. Program Courses Matrix

Courses			Program Competencies																			
Level	Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	D1	D2	D3	D4	Total	
Level 0-1	FRB 001	Analytical geometry & Linear Algebra	1		1																2	
	FRB 003	Statics	1	1																	2	
	FRB 005	Waves and Heat	1	1																	2	
	FRB 007	Chemistry for Engineers	1	1																	2	
	FRM 009	Engineering Drawing						1		1												2
	UHS 103	Social issues							1			1										2
	UHS 101	Foreign Language								1		1										2
Level 0-2	FRB 002	Integration & Multivariable functions	1		1																2	
	FRB 004	Dynamics	1	1																	2	
	FRB 006	Electricity and Magnetism	1	1																	2	
	FRM 008	Production Systems Engineering				1		1													2	
	FRM 010	Engineering Drawing by Computer				1				1												2
	FRE 012	Computer Programming	1		1																	2
	UHS 102	Information and Communication Technology				1						1										2
Level 1-1	FRB 101	Engineering Differential Equations	1	1																	2	
	EMM 101	Fluid Mechanics I		1									1									2
	EMM 103	Mechanics of Machinery			1					1				1	1							4
	FRB 103	Environmental Pollution and Industrial Safety	1	1		1																3
	EME 105	Electric Circuits Analysis	1	1														1	1			4
	EMM 107	Strength and properties of Materials											1	1								2
	EMM 109	Thermodynamics I	1	1									1	1								4
FRB 104	Engineering Numerical Analysis	1	1																		2	

Courses			Program Competencies																			
Level	Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	D1	D2	D3	D4	Total	
Level 1-2	EMM 102	Fluid Mechanics II	1	1									1		1						4	
	EMM 104	Manufacture Technology						1					1								2	
	EME 106	Electrical Machines					1										1				2	
	EMM 108	Measurements and Instrumentation		1												1	1			1	4	
	EMM 110	Solid Mechanics		1										1								2
	EMM 112	Thermodynamics II	1	1										1	1							4
	FT 103	Field Training I							1			1									2	
Level 2-1	FRB 201	Applied Engineering Probability and Mathematical Statistics	1	1																	2	
	EME 201	Logic Circuits and Micro processors		1	1													1	1		4	
	EMM 203	Heat Transfer	1	1									1		1						4	
	EMM 205	Projects Management								1	1										2	
	EME 207	Electrical Power Systems																1	1		2	
	EMM 209	Design of Machine Elements													1	1					2	
Level 2-2	FRB 206	Multiple Integrals & Complex Analysis	1	1																	2	
	EMM 202	Vibrations and System Dynamics	1	1									1	1							4	
	EMM 204	Plumbing Systems	1	1									1		1						4	
	EME 206	Electronic Devices and Circuits		1									1					1	1	1	5	
	EMM 208	Fluid Machinery	1										1		1						3	
	EME 210	Electric Power Distribution Systems														1	1				2	
	FT 203	Field Training II							1			1									2	
Level 3-1	EMM 301	Refrigeration	1	1									1	1							4	
	EMM 303	Air Conditioning Systems	1	1									1	1							4	
	EME 305	Low Current Distribution Systems														1	1				2	

Courses			Program Competencies																			
Level	Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	D1	D2	D3	D4	Total	
	EMM 307	Fire Fighting Systems	1	1									1		1						4	
	EMM 309	Combustion	1	1									1	1							4	
	UHS XXX	Humanities Elective I	Refer to the next two courses																			
Humanities Elective I	UHS 201	Principles of Entrepreneurship and Project Management			1	1															2	
	UHS 203	Human Resources Management			1	1																
Level 3-1	UHS XXX	Humanities Elective II	Refer to the next two courses																			
Humanities Elective II	UHS 301	Communication and Presentation Skills								1	1										2	
	UHS 302	Leadership Skills								1	1											
Level 3-2	EMM 302	Refrigeration and AC Systems/Components	1	1									1	1							4	
	EME 304	Automatic Control											1				1				2	
	EMM 3XX	Elective I	Refer to the next three courses																			
Elective I	EMM 312	Renewable Energy											1	1			1				3	
	EMM 314	Elevators and Escalators											1	1			1					
	EMM 316	Solar Thermal and PV Systems											1	1			1					
Level 3-2	EME 3XX	Elective II	Refer to the next three courses																			
Elective II	EME 322	Advanced Industrial Electronics																1	1		2	
	EME 324	Electrical Protection																1	1			
	EME 326	Electrostatic and Electromagnetic Fields																1	1			

Courses			Program Competencies																			
Level	Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	D1	D2	D3	D4	Total	
Level 3-2	EMM 3XX	Elective III	Refer to the next three courses																			
Elective III	EMM 332	Internal Combustion Engines	1	1									1	1	1						5	
	EMM 334	Essentials of Energy Management	1	1									1	1	1							
	EMM 336	Wind Energy System Design	1	1									1	1	1							
Level 3-2	EMM 390	Senior Design Project I		1	1			1	1			1		1	1	1		1			9	
	UHS 104	Professional Ethics				1	1														2	
Level 4-1	EMM 401	Computer Applications in EI/Mec System											1	1		1					3	
	EMM 403	Process Control and Building management System											1	1					1	1	4	
	EMM 4XX	Elective IV	Refer to the next three courses																			
Elective IV	EMM 411	Cold Stores and Industrial Refrigeration											1	1	1						3	
	EMM 413	Automotive Engineering											1	1	1							
	EMM 415	Power Stations											1	1	1							
Level 4-1	EME 4XX	Elective V	Refer to the next three courses																			
Elective V	EME 421	Electro-Hydraulic Circuits				1							1	1							3	
	EME 423	Codes and Specifications of EI/Mec Systems				1							1	1								
	EME 425	Computer Networks				1							1	1								
Level 4-1	EME 4XX	Elective VI	Refer to the next three courses																			
ct .iv e	EME 431	Modern Control System																	1	1		

Courses			Program Competencies																		
Level	Code	Course Title	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	D1	D2	D3	D4	Total
	EME 433	Power System Analysis															1	1	1		3
	EME 435	Electrical Drives															1	1	1		
Level 4-1	EMM 490	Senior Design Project II		1	1			1	1			1						1			9
	UHS XXX	Humanities Elective III	Refer to the next two courses																		
Humanities Elective III	UHS 801	Research Methodologies					1					1									2
	UHS 803	Thinking Skills					1					1									
Total			27	30	8	7	3	5	5	6	2	8	24	18	10	7	8	8	6	4	186

17. Program Courses Vs. Requirements Matrix

17.1 Compulsory Courses Vs. Requirements Matrix

Level	Courses		Pr. Req.	Weekly Contact Hours					Credit Hours of Requirements			
	Code	Course Title		Cr. Hrs	Lect.	Lab.	Tut.	Total	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirements
Level 0	FRB001	Analytical geometry & Linear Algebra	.....	3	2	0	2	4		3		
	FRB003	Statics	.....	3	2	0	2	4		3		
	FRB005	Waves and Heat	.....	3	2	2	1	5		3		
	FRB007	Chemistry for Engineers	.....	4	3	2	1	6		4		
	FRM009	Engineering Drawing	.....	2	0	0	4	4		2		
	UHS101	Foreign Language	.....	2	2	0	0	2	2			
	UHS103	Social issues	.....	2	2	0	0	2	2			
	FRB002	Integration & Multivariable functions	FRB001	3	2	0	2	4		3		
	FRB004	Dynamics	FRB003	3	2	0	2	4		3		
	FRB006	Electricity and Magnetism	.....	3	2	2	1	5		3		
	FRM008	Production Systems Engineering	.....	2	1	3	0	4		2		
	FRM010	Computer Aided Drafting	FRM009	2	1	2	0	3		2		
	FRE012	Computer Programming Fundamentals	.....	2	0	2	2	4		2		
	UHS102	Information and Communication Technology	.....	2	2	0	0	2	2			
Level 1	FRB 101	Engineering Differential Equations	FRB 002	3	2	0	2	4			3	
	EMM 101	Fluid Mechanics I	FRB 004	2	2	1	0	3			2	
	EMM 103	Mechanics of Machinery	FRB 004	3	2	0	2	4			3	
	EME 105	Electric Circuits Analysis	FRB 006	3	2	1	2	5			3	

Level	Courses		Pr. Req.	Weekly Contact Hours					Credit Hours of Requirements			
	Code	Course Title		Cr. Hrs	Lect.	Lab.	Tut.	Total	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirements
	EMM 107	Strength and properties of Materials	FRB 004	2	2	1	0	3			2	
	EMM 109	Thermodynamics I	FRB 005	2	2	1	0	3			2	
	FRB 103	Environmental Pollution and Industrial Safety	FRB 007	2	2	1	0	3		2		
	FRB 104	Engineering Numerical Analysis	FRB 101	3	2	0	2	4			3	
	EMM 102	Fluid Mechanics II	EMM 101	2	2	1	0	3			2	
	EMM 104	Manufacture Technology	FRM 008	3	2	2	0	4			3	
	EME 106	Electrical Machines	EME 105	3	2	1	1	4			3	
	EMM 108	Measurements and Instrumentation	FRB 006	3	2	1	1	4			3	
	EMM 110	Solid Mechanics	EMM 107	2	2	1	0	3			2	
EMM 112	Thermodynamics II	EMM 109	2	2	1	0	3			2		
Level 2	FRB 201	Applied Engineering Probability and Mathematical Statistics	FRB 002	3	2	2	0	4			3	
	EME 201	Logic Circuits and Micro processors	EME 105	3	2	1	2	5			3	
	EMM 203	Heat Transfer	EMM 109	3	2	1	1	4			3	
	EMM 205	Projects Management	.....	2	2	0	1	3			2	
	EME 207	Electrical Power Systems	EME 106	3	2	0	2	4			3	
	EMM 209	Design of Machine Elements	EMM 104 & EMM 110	3	2	1	2	5			3	
	FRB 206	Multiple Integrals & Complex Analysis	FRB 002	3	2	0	2	4			3	
	EMM 202	Vibrations and System Dynamics	EMM 103, EMM 107	3	2	1	1	4			3	
	EMM 204	Plumbing Systems	EMM 102	3	2	0	2	4				3
	EME 206	Electronic Devices and Circuits	EME 201	3	2	1	1	4			3	
EMM 208	Fluid Machinery	EMM 102	3	2	1	1	4			3		

Level	Courses		Pr. Req.	Weekly Contact Hours					Credit Hours of Requirements			
	Code	Course Title		Cr. Hrs	Lect.	Lab.	Tut.	Total	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirements
	EME 210	Electric Power Distribution Systems	EME 207	3	2	0	3	5				3
Level 3	EMM 301	Refrigeration	EMM 112	2	2	1	0	3				2
	EMM 303	Air Conditioning Systems	EMM 112	3	2	1	1	4				3
	EME 305	Low Current Distribution Systems	EME 210	3	2	0	2	4				3
	EMM 307	Fire Fighting Systems	EMM 102	3	2	0	2	4				3
	EMM 309	Combustion	EMM 112	3	2	1	1	4			3	
	UHS XXX	Humanities Elective I	.....	2	2	0	0	2	2			
	UHS XXX	Humanities Elective II	.....	2	2	0	0	2	2			
	EMM 302	Refrigeration and AC Systems/Components	EMM 301 & EMM 303	3	2	1	1	4				3
	EME 304	Automatic Control	EME 106	2	2	1	0	3			2	
	EMM 3XX	Elective I	*	3	2	0	2	4				3
	EME 3XX	Elective II	*	3	2	0	2	4				3
	EMM 3XX	Elective III	*	3	2	0	2	4				3
	EMM 390	Senior Design Project I	**	2	0	4	0	4				2
UHS 104	Professional Ethics	.....	2	2	0	0	2	2				
Level 4	EMM 401	Computer Applications in El/Mec System	EME 305 & EMM 303	2	1	2	0	3				2
	EMM 403	Process Control and Building management System	EME 304	2	2	1	0	3				2
	EMM 3XX	Elective IV	*	3	2	0	2	4				3
	EME 3XX	Elective V	*	3	2	0	2	4				3
	EMM 3XX	Elective VI	*	3	2	0	2	4				3
	UHS XXX	Humanities Elective III	.....	2	2	0	0	2	2			

Level	Courses		Pr. Req.	Weekly Contact Hours					Credit Hours of Requirements			
	Code	Course Title		Cr. Hrs	Lect.	Lab.	Tut.	Total	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirements
	EMM 490	Senior Design Project II	EMM 390	3	1	4	0	5				3
FT	FT 103	Field Training I	***									
	FT 203	Field Training II	****									
Total hours of five Levels									14	32	67	47
% Hours of five Levels									8.75	20	41.875	29.375
Reference Ratio									Min 8%	Min 20%	Min 35%	Max 30%
** The student can register for the Senior Design Project course after passing 70% of the program cr. hr_s, 112 hr_s												
*** Completion of 65 Credit Hours												
****Completion of 96 Credit Hours												

17.2 Elective Courses Vs. Requirements Matrix

Level		Courses		Pr. Req.	Weekly Contact Hours					Credit Hours of Subject Area			
		Code	Course Title		Cr.Hrs	Lect.	Lab.	Tut.	Total	University Requirements	Faculty Requirements	Discipline Requirements	Program Requirements
Elective Course-1	Four	EMM 312	Renewable Energy	EME 106 & EMM 109	3	2	0	2	4				3
		EMM 314	Elevators and Escalators	EMM 209	3	2	0	2	4				3
		EMM 316	Solar Thermal and PV Systems	EMM 203	3	2	0	2	4				3
Elective Course-2	Four	EME 322	Advanced Industrial Electronics	EME 206	3	2	0	2	4				3
		EME 324	Electrical Protection	EME 305	3	2	0	2	4				3
		EME 326	Electrostatic and Electromagnetic Fields	EME 106	3	2	0	2	4				3
Elective Course-3	Four	EMM 332	Internal Combustion Engines	EMM 309	3	2	0	2	4				3
		EMM 334	Essentials of Energy Management	EMM 205	3	2	0	2	4				3
		EMM 336	Wind Energy System Design	EMM 208 & EMM 309	3	2	0	2	4				3
Elective Course-4	Four	EMM 411	Cold Stores and Industrial Refrigeration	EMM 301	3	2	0	2	4				3
		EMM 413	Automotive Engineering	EMM 309	3	2	0	2	4				3
		EMM 415	Power Stations	EMM 112	3	2	0	2	4				3
Elective Course-5	Four	EME 421	Electro-Hydraulic Circuits	EME 304	3	2	0	2	4				3
		EME 423	Codes and Specifications of EI/Mec Systems	EMM 302 & EME 305	3	2	0	2	4				3
		EME 425	Computer Networks	EME 105	3	2	0	2	4				3
Elective Course-6	Four	EMM 431	Modern Control System	EME 304	3	2	0	2	4				3
		EMM 433	Power System Analysis	EME 305	3	2	0	2	4				3
		EMM 435	Electrical Drives	EME 106 & EME 304	3	2	0	2	4				3

18. Program Competencies Vs. Learning and Teaching Methods Matrix

Teaching and Learning Methods	Program competencies																	
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	D1	D2	D3	D4
Lecture	*	*	*	*		*		*	*		*	*	*	*	*	*	*	*
Tutorials	*	*	*	*		*		*			*	*	*	*	*	*	*	*
Computer-based Instruction	*	*	*	*				*			*	*				*		*
Problem-based Learning	*	*	*	*					*		*	*		*				
Project-based Learning			*			*	*		*			*		*	*	*	*	
Interactive Learning	*	*		*			*	*	*	*		*	*					
Presentations		*	*	*	*			*	*							*	*	
Report					*		*		*	*			*	*				
Co-operative Learning					*		*										*	*
Brain Storming			*	*			*	*	*				*	*	*			
Projects			*			*	*	*	*				*	*		*	*	*
Discussion	*	*	*	*		*		*		*	*		*	*	*			*
Case Study			*	*					*	*			*	*	*	*	*	*
Practical-based Learning	*	*		*		*	*	*			*						*	*
Self-Learning					*					*						*	*	*
Hybrid Learning	*		*	*	*			*	*	*	*	*	*	*	*	*	*	*
Teaching and Learning Methods for Students with Special Needs:																		
Methods																		
1. Discussion Session																		
2. Extra Lectures																		
3. Create classroom centers																		
4. Rotate lessons																		
5. Provide different levels of books and materials																		

19. Program Competencies Vs. Assessment Methods Matrix

Assessment Methods		Program Competencies																	
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	B1	B2	B3	B4	D1	D2	D3	D4
Formative Assessment Method																			
Tests	Oral Test	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Mid-term	*	*	*	*		*		*	*		*	*	*	*	*	*	*	*
	Experimental	*	*	*	*		*	*				*	*	*	*	*	*	*	*
	Quizzes	*	*	*	*		*		*			*	*	*	*	*	*	*	*
Reports		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Observation		*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
Discussions		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Projects	Projects	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Mini Projects	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Assignments		*	*	*	*		*		*	*	*	*	*	*	*	*	*	*	*
Presentations				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Summative Assessment Method																			
Practical			*		*			*	*			*	*	*	*	*	*	*	*
Oral Exam		*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*
Final Exam		*	*	*	*		*		*	*	*	*	*	*	*	*	*	*	*

20. Assessment Methods Vs. Teaching and Learning Methods Matrix

Assessment Methods		Teaching and Learning Methods															
		Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Report	Co-operative Learning	Brain- Storming	Projects	Discussion	Case Study	Practical-based Learning	Self-Learning	Hybrid Learning
Tests	Oral Test	*	*	*	*	*	*	*	*			*	*	*	*	*	*
	Mid-term	*	*	*	*		*	*			*		*		*		*
	Experimental	*	*	*	*		*					*		*		*	
	Quizzes	*	*	*	*							*		*		*	*
Reports		*						*	*			*		*	*	*	*
Observation		*	*		*		*	*		*	*			*		*	*
Discussions		*	*	*	*	*		*	*		*		*	*	*		*
Projects	Projects				*		*	*	*	*		*	*	*	*	*	*
	Mini Projects	*	*	*	*	*	*	*		*	*		*	*	*		*
Assignments		*	*	*	*		*					*		*		*	*
Presentations		*				*	*	*	*			*		*		*	*
Practical		*		*			*							*		*	
Oral Exam		*		*		*	*	*	*			*	*		*	*	*
Final Exam		*	*	*	*		*	*			*		*		*		*

21. Program Courses Vs. Teaching and Learning Methods Matrix

Courses			Teaching and Learning Methods															
Level	Code	Course Title	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Report	Co-operative Learning	Brain Storming	Projects	Discussion	Case Study	Practical-based Learning	Self-Learning	Hybrid Learning
Level 0-1	FRB 001	Analytical Geometry & Linear Algebra	*	*		*								*				
	FRB 003	Statics	*	*										*				
	FRB 005	Waves and Heat	*	*												*		
	FRB 007	Chemistry for Engineers	*	*		*		*								*		
	FRM 009	Engineering Drawing	*	*										*				
	UHS 103	Social issues	*							*					*		*	*
	UHS 101	Foreign Language	*					*							*		*	
Level 0-2	FRB 002	Integration & Multivariable functions	*	*		*												
	FRB 004	Dynamics	*	*										*				
	FRB 006	Electricity and Magnetism	*	*												*		
	FRM 008	Production Systems Engineering	*											*		*		
	FRM 010	Engineering Drawing by Computer	*		*			*										
	FRE 012	Computer Programming		*	*	*												
	UHS 102	Information and Communication Technology	*							*				*				
Level 1-1	FRB 101	Engineering Differential Equations	*	*										*				

Courses			Teaching and Learning Methods															
Level	Code	Course Title	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Report	Co-operative Learning	Brain Storming	Projects	Discussion	Case Study	Practical-based Learning	Self-Learning	Hybrid Learning
	EMM 101	Fluid Mechanics I	*	*										*				
	EMM 103	Mechanics of Machinery	*	*										*				
	FRB 103	Environmental Pollution and Industrial Safety	*													*		
	EME 105	Electric Circuits Analysis	*	*							*					*		
	EMM 107	Strength and properties of Materials	*	*										*		*		
	EMM 109	Thermodynamics I	*	*										*				
Level 1-2	FRB 104	Engineering Numerical Analysis	*		*									*				
	EMM 102	Fluid Mechanics II	*	*										*				
	EMM 104	Manufacture Technology	*	*		*				*			*	*				
	EME 106	Electrical Machines	*	*							*			*				
	EMM 108	Measurements and Instrumentation	*	*		*												
	EMM 110	Solid Mechanics	*	*										*		*		
	EMM 112	Thermodynamics II	*	*										*				
	FT 103	Field Training I								*				*			*	
Level 2-1	FRB 201	Applied Engineering Probability and Mathematical Statistics	*	*	*									*				
	EME 201	Logic Circuits and Micro processors	*	*							*		*	*				

Courses			Teaching and Learning Methods															
Level	Code	Course Title	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Report	Co-operative Learning	Brain Storming	Projects	Discussion	Case Study	Practical-based Learning	Self-Learning	Hybrid Learning
	EMM 203	Heat Transfer	*	*										*			*	
	EMM 205	Projects Management	*	*														
	EME 207	Electrical Power Systems	*	*										*				
	EMM 209	Design of Machine Elements	*	*										*				
Level 2-2	FRB 206	Multiple Integrals & Complex Analysis	*	*	*	*								*				
	EMM 202	Vibrations and System Dynamics	*	*								*	*					
	EMM 204	Plumbing Systems	*	*									*				*	
	EME 206	Electronic Devices and Circuits	*	*					*									
	EMM 208	Fluid Machinery	*	*	*										*			
	EME 210	Electric Power Distribution Systems	*	*										*				
	FT 203	Field Training II								*				*			*	
Level 3-1	EMM 301	Refrigeration	*	*										*				
	EMM 303	Air Conditioning Systems	*	*										*				
	EME 305	Low Current Distribution Systems	*	*										*				
	EMM 307	Fire Fighting Systems	*	*										*			*	
	EMM 309	Combustion	*	*						*								
		UHS XXX	Humanities Elective I	Refer to the next two courses														

Courses			Teaching and Learning Methods															
Level	Code	Course Title	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Report	Co-operative Learning	Brain Storming	Projects	Discussion	Case Study	Practical-based Learning	Self-Learning	Hybrid Learning
Humanities Elective I	UHS 201	Principles of Entrepreneurship and Project Management	*			*						*		*				
	UHS 203	Human Resources Management	*			*						*		*				
Level 3-1	UHS XXX	Humanities Elective II	Refer to the next two courses															
Humanities Elective II	UHS 301	Communication and Presentation Skills	*					*	*									*
	UHS 302	Leadership Skills	*						*									
Level 3-2	EMM 302	Refrigeration and AC Systems/Components	*	*										*				
	EME 304	Automatic Control	*	*										*				
	EMM 3XX	Elective I	Refer to the next three courses															
Elective I	EMM 312	Renewable Energy	*	*										*			*	
	EMM 314	Elevators and Escalators	*	*						*					*			
	EMM 316	Solar Thermal and PV Systems	*	*		*												
Level 3-2	EME 3XX	Elective II	Refer to the next three courses															

Courses			Teaching and Learning Methods															
Level	Code	Course Title	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Report	Co-operative Learning	Brain Storming	Projects	Discussion	Case Study	Practical-based Learning	Self-Learning	Hybrid Learning
Elective II	EME 322	Advanced Industrial Electronics	*	*					*				*	*				
	EME 324	Electrical Protection	*	*		*				*				*				
	EME 326	Electrostatic and Electromagnetic Fields	*	*						*				*				
Level 3-2	EMM 3XX	Elective III	Refer to the next three courses															
Elective III	EMM 332	Internal Combustion Engines	*	*											*			
	EMM 334	Essentials of Energy Management	*	*											*			
	EMM 336	Wind Energy System Design	*	*											*			
Level 3-2	EMM 390	Senior Design Project I							*					*				
	UHS 104	Professional Ethics	*					*										*
Level 4-1	EMM 401	Computer Applications in EI/Mec System	*	*	*													
	EMM 403	Process Control and Building management System	*	*		*				*								
	EMM 4XX	Elective IV	Refer to the next three courses															
Elective IV	EMM 411	Cold Stores and Industrial Refrigeration	*						*	*					*			
	EMM 413	Automotive Engineering	*							*					*		*	

Courses			Teaching and Learning Methods															
Level	Code	Course Title	Lecture	Tutorials	Computer-based Instruction	Problem-based Learning	Project-based Learning	Interactive Learning	Presentations	Report	Co-operative Learning	Brain Storming	Projects	Discussion	Case Study	Practical-based Learning	Self-Learning	Hybrid Learning
	EMM 415	Power Stations	*	*										*	*		*	
Level 4-1	EME 4XX	Elective V	Refer to the next three courses															
Elective V	EME 421	Electro-Hydraulic Circuits	*	*										*			*	
	EME 423	Codes and Specifications of EI/Mec Systems	*	*		*			*									
	EME 425	Computer Networks	*	*		*	*	*								*		
Level 4-1	EME 4XX	Elective VI	Refer to the next three courses															
Elective VI	EME 431	Modern Control System	*	*									*	*				
	EME 433	Power System Analysis	*	*														
	EME 435	Electrical Drives	*	*						*								
Level 4-1	EMM 490	Senior Design Project II	*						*					*				
	UHS XXX	Humanities Elective III	Refer to the next two courses															
Humanities Elective III	UHS 801	Research Methodologies	*						*	*		*					*	*
	UHS 803	Thinking Skills	*						*	*		*					*	*

22. Program Courses Vs. Assessment Methods Matrix

Courses			Assessment Methods													
Level	Code	Course Title	Oral Test	Mid-term	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini Projects	Assignments	Presentations	Practical	Oral Exam	Final Exam
Level 0-1	FRB 001	Analytical geometry & Linear Algebra		*		*						*				*
	FRB 003	Statics		*		*						*				*
	FRB 005	Waves and Heat	*	*	*							*				*
	FRB 007	Chemistry for Engineers	*	*	*			*								*
	FRM 009	Engineering Drawing		*								*				*
	UHS 103	Social issues		*				*					*			*
	UHS 101	Foreign Language		*				*	*	*						*
Level 0-2	FRB 002	Integration & Multivariable functions		*		*			*							*
	FRB 004	Dynamics		*		*						*				*
	FRB 006	Electricity and Magnetism	*	*	*							*				*
	FRM 008	Production Systems Engineering	*	*	*			*		*						*
	FRM 010	Engineering Drawing by Computer		*							*	*		*	*	
	FRE 012	Computer Programming	*	*	*							*		*	*	
	UHS 102	Information and Communication Technology		*				*								*
Level 1-1	FRB 101	Engineering Differential Equations		*		*			*							*
	EMM 101	Fluid Mechanics I		*		*						*				*
	EMM 103	Mechanics of Machinery		*								*				*
	FRB 103	Environmental Pollution and Industrial Safety		*	*	*						*				*
	EME105	Electric Circuits Analysis			*				*					*		*
	EMM 107	Strength and properties of Materials		*						*						*

Courses			Assessment Methods													
Level	Code	Course Title	Oral Test	Mid-term	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini Projects	Assignments	Presentations	Practical	Oral Exam	Final Exam
	EMM 109	Thermodynamics I		*		*										
Level 1-2	FRB 104	Engineering Numerical Analysis		*	*	*						*				*
	EMM 102	Fluid Mechanics II		*		*						*				*
	EMM 104	Manufacture Technology		*						*					*	*
	EME 106	Electrical Machines		*			*		*							*
	EMM 108	Measurements and Instrumentation	*	*								*				*
	EMM 110	Solid Mechanics		*								*				*
	EMM 112	Thermodynamics II		*		*						*				*
	FT 103	Field Training I	*				*						*			
Level 2-1	FRB 201	Applied Engineering Probability and Mathematical Statistics		*	*	*			*							*
	EME 201	Logic Circuits and Micro processors		*	*										*	*
	EMM 203	Heat Transfer		*		*	*					*				*
	EMM 205	Projects Management		*		*			*							*
	EME 207	Electrical Power Systems		*		*	*									*
	EMM 209	Design of Machine Elements		*							*		*			*
Level 2-2	FRB 206	Multiple Integrals & Complex Analysis		*					*			*				*
	EMM 202	Vibrations and System Dynamics		*		*					*	*				*
	EMM 204	Plumbing Systems		*		*	*					*				*
	EME 206	Electronic Devices and Circuits		*		*	*					*				*
	EMM 208	Fluid Machinery	*	*		*										*
	EME 210	Electric Power Distribution Systems		*		*	*									*

Courses			Assessment Methods													
Level	Code	Course Title	Oral Test	Mid-term	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini Projects	Assignments	Presentations	Practical	Oral Exam	Final Exam
	FT 203	Field Training II	*				*						*			
Level 3-1	EMM 301	Refrigeration	*	*								*				*
	EMM 303	Air Conditioning Systems	*	*								*		*		*
	EME 305	Low Current Distribution Systems	*	*		*										*
	EMM 307	Fire Fighting Systems		*		*	*					*				*
	EMM 309	Combustion	*	*			*							*		*
	UHS XXX	Humanities Elective I	Refer to the next two courses													
Humanities Elective I	UHS 201	Principles of Entrepreneurship and Project Management		*					*		*					*
	UHS 203	Human Resources Management		*				*	*							*
Level 3-1	UHS XXX	Humanities Elective II	Refer to the next two courses													
Humanities Elective II	UHS 301	Communication and Presentation Skills		*									*			*
	UHS 302	Leadership Skills		*				*					*			*
Level 3-2	EMM 302	Refrigeration and AC Systems/Components	*	*		*			*							*
	EME 304	Automatic Control	*	*		*			*							*
	EMM 3XX	Elective I	Refer to the next three courses													
Elective I	EMM 312	Renewable Energy		*			*					*				*
	EMM 314	Elevators and Escalators		*						*		*				*

Courses			Assessment Methods													
Level	Code	Course Title	Oral Test	Mid-term	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini Projects	Assignments	Presentations	Practical	Oral Exam	Final Exam
	EMM 316	Solar Thermal and PV Systems		*		*						*				*
Level 3-2	EME 3XX	Elective II	Refer to the next three courses													
Elective II	EME 322	Advanced Industrial Electronics	*	*						*						*
	EME 324	Electrical Protection		*			*					*				*
	EME 326	Electrostatic and Electromagnetic Fields		*								*				*
Level 3-2	EMM 3XX	Elective III	Refer to the next three courses													
Elective III	EMM 332	Internal Combustion Engines		*								*				*
	EMM 334	Essentials of Energy Management		*								*				*
	EMM 336	Wind Energy System Design		*								*				*
Level 3-2	EMM 390	Senior Design Project I					*		*				*		*	
	UHS 104	Professional Ethics		*				*								*
Level 4-1	EMM 401	Computer Applications in EI/Mec System		*						*				*	*	*
	EMM 403	Process Control and Building management System		*			*					*		*		*
	EMM 4XX	Elective IV	Refer to the next three courses													
Elective IV	EMM 411	Cold Stores and Industrial Refrigeration		*		*										*
	EMM 413	Automotive Engineering		*		*						*				*
	EMM 415	Power Stations		*		*	*					*				*
Level 4-1	EME 4XX	Elective V	Refer to the next three courses													

Courses			Assessment Methods													
Level	Code	Course Title	Oral Test	Mid-term	Experimental	Quizzes	Reports	Observation	Discussions	Projects	Mini Projects	Assignments	Presentations	Practical	Oral Exam	Final Exam
Elective V	EME 421	Electro-Hydraulic Circuits	*	*		*						*				*
	EME 423	Codes and Specifications of El/Mec Systems		*			*					*				*
	EME 425	Computer Networks		*	*				*	*		*				*
Level 4-1	EME 4XX	Elective VI	Refer to the next three courses													
Elective VI	EME 431	Modern Control System		*		*				*		*				*
	EME 433	Power System Analysis		*								*				*
	EME 435	Electrical Drives		*					*							*
Level 4-1	EMM 490	Senior Design Project II					*		*				*		*	
	UHS XXX	Humanities Elective III	Refer to the next two courses													
Humanities Elective III	UHS 801	Research Methodologies		*			*	*					*			*
	UHS 803	Thinking Skills		*			*	*					*			*

Coordinator of Program Quality Assurance Committee

Beshoy Abdou



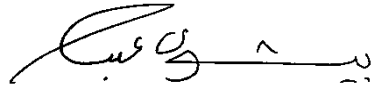
Dr. Beshoy Abdou Aziz

Program Coordinator

Wael A. Mohamed

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فريق توصيف البرنامج وتبنى المعايير الأكاديمية لبرنامج الهندسة الكهروميكانيكية (نظام الساعات المعتمدة) بالبرامج المتعددة التخصصات بكلية الهندسة ببها - جامعة بنها.

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